

What is claimed is:

1. An antenna, comprising:
a plurality of conductor segments; and
a plurality of capacitors, wherein the conductor segments are serially
5 connected through the plurality of capacitors.

2. The antenna of claim 1, further comprising an antenna drive circuit
coupled to the plurality of conductor segments, and operable to provide power to the
conductor segments at a predetermined frequency.

3. The antenna of claim 2, wherein first and last conductor segments of
the plurality of conductor segments form an input, and wherein the antenna drive
circuit is coupled to the input.

4. The antenna of claim 2, wherein the conductor segments have an
inductive reactance associated therewith, and wherein the capacitors have a
capacitive reactance associated therewith, and wherein one of the conductors and
one of the capacitors form an antenna segment, wherein the inductive reactance and
capacitive reactance of the antenna segment are equal at the predetermined
20 frequency.

5. The antenna of claim 2, wherein the plurality of conductor segments
and plurality of capacitors form a resonant circuit at the predetermined frequency.

6. The antenna of claim 2, wherein the antenna drive circuit comprises an oscillator circuit.

7. The antenna of claim 6, wherein the oscillator circuit comprises a push-pull type oscillator circuit.

8. The antenna of claim 1, wherein the plurality of conductor segments and capacitors are arranged azimuthally symmetric, wherein a non-uniform capacitive electrostatic field component along each conductor segment is repeated in an azimuthally symmetric fashion.

9. An antenna, comprising:
a plurality of alternating conductors and capacitors serially coupled together to form a string of antenna segments; and
an antenna driver circuit coupled to the string of antenna segments, and operable to drive the string of antenna segments at a predetermined frequency.

10. The antenna of claim 9, wherein the conductor segments have an inductive reactance associated therewith, and wherein the capacitors have a capacitive reactance associated therewith, and wherein one of the conductors and one of the capacitors form an antenna segment, wherein the inductive reactance and capacitive reactance of the antenna segment are equal at the predetermined frequency.

11. The antenna of claim 9, wherein the plurality of conductor segments and plurality of capacitors form a resonant circuit at the predetermined frequency.

12. The antenna of claim 9, wherein the string of antenna segments are arranged azimuthally symmetric, wherein a non-uniform capacitive electrostatic field component along each conductor segment is repeated in an azimuthally symmetric fashion.

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13. An ion shower system, comprising
a plasma source operable to generate source gas ions within a chamber,
wherein the plasma source further comprises:
a plurality of conductor segments;
10 a plurality of capacitors, wherein the conductor segments are serially
connected through the plurality of capacitors;
an antenna drive circuit coupled to the plurality of conductor segments,
and operable to provide power to the conductor segments and capacitors at a
predetermined frequency; and
15 a source gas inlet,
wherein the source gas inlet is operable to provide a source gas to the
chamber, and wherein the conductor segments, capacitors and antenna drive circuit
cooperatively provide energy to charged particles in the chamber, thereby energizing
the charged particles and generating a plasma comprising source gas ions and
20 electrons within the chamber due to ionizing collisions between the energized
charged particles and the source gas;
an extraction assembly associated with the chamber, and operable to extract
source gas ions therefrom.

25 14. The ion shower of claim 13, further comprising a workpiece support
structure associated with the chamber, and operable to secure the workpiece for
implantation thereof of source gas ions from the extraction assembly.

15. The ion shower of claim 13, wherein first and last conductor segments of the plurality of conductor segments form an input, and wherein the antenna drive circuit is coupled to the input.

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16. The ion shower of claim 13, wherein the conductor segments have an inductive reactance associated therewith, and wherein the capacitors have a capacitive reactance associated therewith, and wherein one of the conductors and one of the capacitors form an antenna segment, wherein the inductive reactance and capacitive reactance of the antenna segment are equal at the predetermined frequency.

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17. The ion shower of claim 13, wherein the plurality of conductor segments and plurality of capacitors form a resonant circuit at the predetermined frequency.

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18. The ion shower of claim 13, wherein the antenna drive circuit comprises an oscillator circuit.

19. The ion shower of claim 18, wherein the oscillator circuit comprises a push-pull type oscillator circuit.

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20. The ion shower of claim 13, wherein the plurality of conductor segments and capacitors are arranged within the chamber in an azimuthally symmetric fashion, wherein a non-uniform capacitive electrostatic field component along each conductor segment is repeated in an azimuthally symmetric fashion.

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21. The ion shower of claim 13, wherein the extraction assembly is associated with a top portion of the chamber, and is operable to extract ions vertically from the top portion thereof.

5 22. The ion shower of claim 21, further comprising a workpiece support structure associated with the top portion of the chamber, and operable to secure the workpiece having an implantation surface orientated facing downward toward the extraction assembly for implantation thereof.

10 23. The ion shower of claim 13, wherein the chamber further comprises a bottom portion and side portions, and wherein the side portions comprise a plurality of multi-cusp magnet devices operable to produce multi-cusp magnetic fields thereat to facilitate an azimuthal uniformity of plasma within the chamber.

15 24. The ion shower of claim 23, wherein the multi-cusp magnet devices comprise electromagnets operable to provide a variation in multi-cusp magnetic field strength at differing positions along the side portions.

20 25. The ion shower of claim 24, wherein the electromagnets are independently controllable, thereby facilitating a tuning of the multi-cusp magnetic fields.

25 26. The ion shower of claim 13, wherein the plasma source further comprises two grounding rods operable to collect excess electrons within the chamber during extraction of ions from the top portion thereof.

27. The ion shower of claim 26, wherein the two grounding rods are silicon coated, and wherein when one of the grounding rods is grounded, the other grounding rod is negatively biased with respect to plasma within the chamber, thereby causing the other grounding rod to be sputtered by the plasma and substantially preventing the other grounding rod from becoming an insulator due to excessive oxidation thereof.

28. The ion shower of claim 27, wherein the two grounding rods are coupled to a square-wave voltage associated with the plasma source, and wherein a phase difference of the square-wave voltages between the two grounding rods is approximately 180 degrees.

29. The ion shower of claim 13, the extraction assembly comprising a plurality of electrodes, wherein a first electrode comprises a plasma electrode having a plurality of extraction apertures associated therewith, and a second electrode comprises an extraction electrode biased negatively with respect to the chamber and disposed between the plasma electrode and the workpiece support structure, the extraction electrode having a plurality of extraction apertures substantially aligned with respect to the plasma electrode extraction apertures, and further comprising one or more interstitial pumping apertures operable to reduce a pressure thereat to a second pressure substantially less than the first pressure.